

User's manual

KNX MultiVent (MV-K)

Article number: 5400x

Suitable for the following YIT damper valve types:

Article number Valve description

0504	KT-VAV-KNX-40%-Basic
0505	KT-VAV-KNX-40%-1x16A
0506	KT-VAV-KNX-40%-2x16A
0507	KT-VAV-KNX-60%-Basic
0508	KT-VAV-KNX-60%-1x16A
0509	KT-VAV-KNX-60%-2x16A
0510	KT-VAV-KNX-2x40%-Basic
0511	KT-VAV-KNX-2x40%-1x16A
0512	KT-VAV-KNX-2x40%-2x16A



Picture: Art. no. 54002 - KNX MultiVent with 1 relay

Table of contents:

1	<i>Application</i>	3
2	<i>Valve control</i>	4
3	<i>Relay functions</i>	5
4	<i>Programming and test</i>	7
4.1	Installation procedure	7
5	<i>Internal cabling</i>	8
6	<i>List of objects</i>	10
7	<i>Parameters</i>	13
8	<i>Technical data</i>	16

1 Application

KNX MultiVent is a control card for the YIT damper valve. MultiVent can control and supervise the damper valve blades and report status via the KNX bus. MultiVent can control both one- and two valve blade damper units (KT-VAV-KNX-40%, 60%, and 2x40%)

KNX MultiVent is mounted, furnished with cables and tested at the production site. Quick connect plugs ensures quick and easy installation at the construction site.

KNX MultiVent has KNX objects and parameters especially designed for the YIT damper valve. The valve functions can directly communicate with other KNX based products like motion detectors, thermostats, actuators and other sensors.



YIT Damper unit with KNX MultiVent with 1 relay

Relays and valve blades will be un-changed after ETS download and after return of KNX/mains power.

MultiVent versions:

- | |
|--|
| Art.nr. 54001: KNX MultiVent basic |
| Art.nr. 54002: KNX MultiVent with 1 relay |
| Art.nr. 54003: KNX MultiVent with 2 relays |



KNX MultiVent must be installed as described in this document. Note especially the load characteristics and circuit breaker information.



KNX MultiVent is connected to 230V AC and the printed circuit board must always be encapsulated.



Maximum circuit breaker for the KNX MultiVent is 16A with C-characteristics.

2 Valve control

Valve blade supervision

KNX MultiVent will supervise the valve blade position. If the wanted valve blade position has not been reached after 40 seconds, the valve blade motor will be stopped and an error condition is reported.

Each valve blade has a counter that counts the number of valve blade operations. This function makes it possible to plan service intervals based on actual valve usage.

Forced operation and Fire-mode

Each valve blade can be configured either to go to open or closed position by using the "Forced operation" object. This function is very useful when commissioning and testing the ventilation system.

MultiVent has a dedicated "Fire" object that can be configured to either open or close both valves in case of fire.

See Figure 1 for overview of the valve blade functions

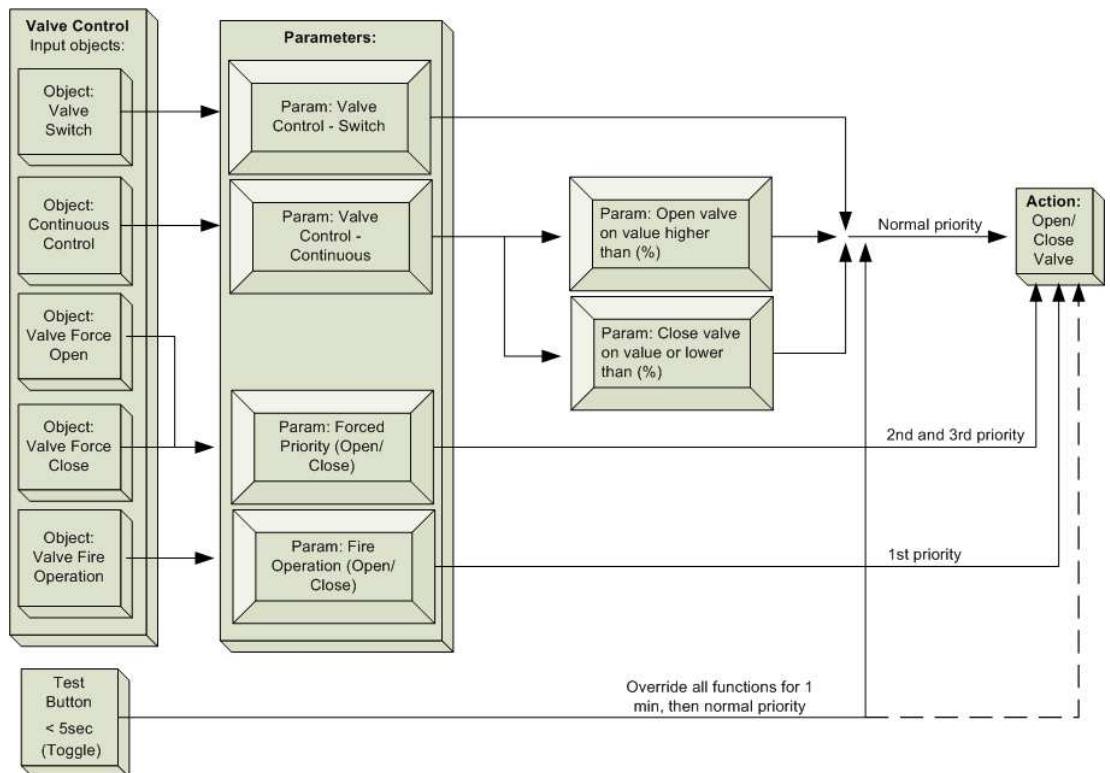


Figure 1 – Block diagram over the valve blade functions

3 Relay functions

KNX MultiVent (art.nr. 54002 and 54003) includes one or two general purpose relays. The relay can control fixed installations like light, electrical heaters and heat cables.

These functions are available for the relays:

- On/Off control
- On/Off control with time delay
- Staircase function with a disable object
- Logical AND or OR function
- Force object for either forcing the relay ON or OFF
- Heat/Cooling control ON/OFF or PWM control

See Figure 2 for an overview of the relay functions

Note: The relay type is Grüner 707L and is designed for capacitive loads with large inrush currents like lamp loads. The number of operations for the relay is dependent upon the type of load and the current. The table below shows a list of the maximum load.

Type of load	Maximum load (230V AC)
Flourecent light (70µF)	650W
Transformer for halogen light bulbs	500VA
Electrical heat cables, electrical heaters	1250W
Maximum inrush current	260A i 250 µS

Note: The relay gives an audible sound when the relay changes position. This sound can cause irritation especially if the relay is used for heating/cooling control with PWM. Low time period for PWM control will result in more audible sound and lower life time for the relay.



The number of light fixtures connected to the relay is limited by the inrush current.

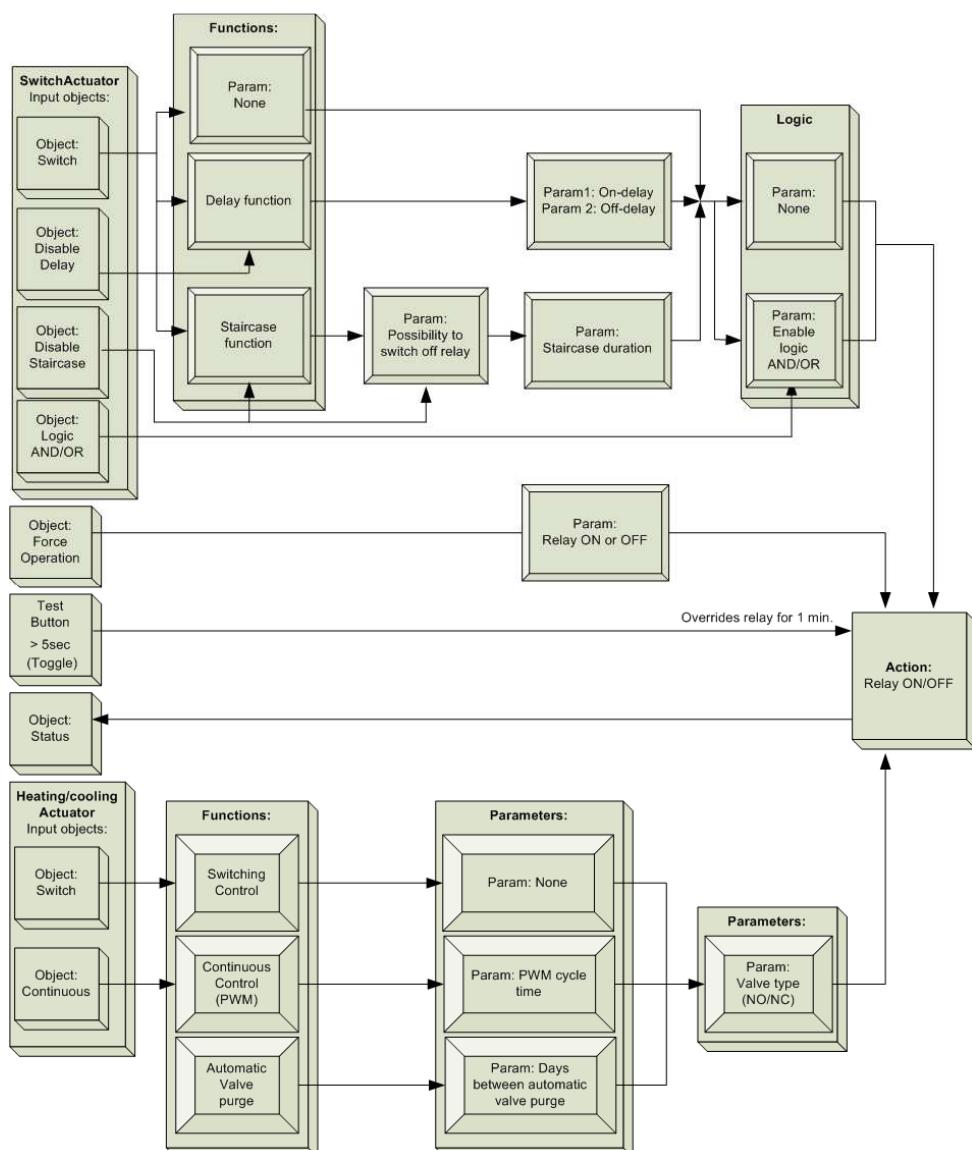
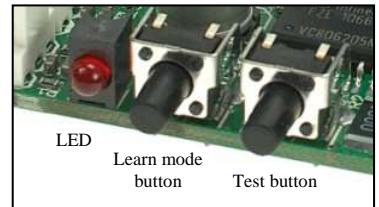


Figure 2 – Block diagram for the relay functions

4 Programming and test

KNX MultiVent has 2 buttons and a LED that are accessible from the side of the damper valve. The LED can indicate two error conditions by blinking the LED. The LED will blink 5 times per second if the desired valve blade position was not reached. This failure situation could be caused by faulty motor or micro switches, cable- or mechanical malfunction. The LED will blink once per second if the KNX MultiVent is un-programmed.

The button next to the LED is the KNX Learn mode button. The LED will be lit permanently if the learn mode button is pressed. The LED will start to blink once per second when the KNX application is being downloaded. The blinking stops when the download is complete.



The button furthest away from the LED is the test button for checking proper operation of valve blades and relays. If the button is pressed once then valve blade 1 will change position. If the button is pressed again within one minute, valve blade 2 will change position. If the button is for more than 5 seconds, then relay 1 will change position. If it is pressed for more than 5 seconds again, relay 2 will change position.

4.1 Installation procedure

1. Make sure covers and screws are securely fastened
2. Mount the damper valve on to the ventilation duct.
3. Connect the KNX cable to the KNX bus (wago quick connect).
4. Connect the fixed 230V AC load to the Wago chassis plug(s) for 1. relay or 2. relay version.
5. Connect the mains cable to 230V (Wago quick connect)
6. Press the test button once for a one valve blade damper unit or twice for two valve blade damper unit, check that the valve blades change position. The relay(s) can be checked by holding the test button for more than 5 seconds.
7. KNX MultiVent enters KNX learn mode by pressing the learn mode button (the button next to the LED).
8. Download via ETS

5 Internal cabling

The internal cabling of valve motor and position switches for a KT-VAV-KNX-2x40 damper unit is shown in Figure 3. A one valve blade damper unit KT-VAV-KNX-40% or 60% has the same cabling, except that W3 and W6 is not connected. The brown and green wire for cable W2 must change place for a one valve blade 60% damper unit. All connections and wires has been mounted and tested in production.

Cabling of the 230V and KNX bus cable is shown in Figure 4 (for 2.relay version).

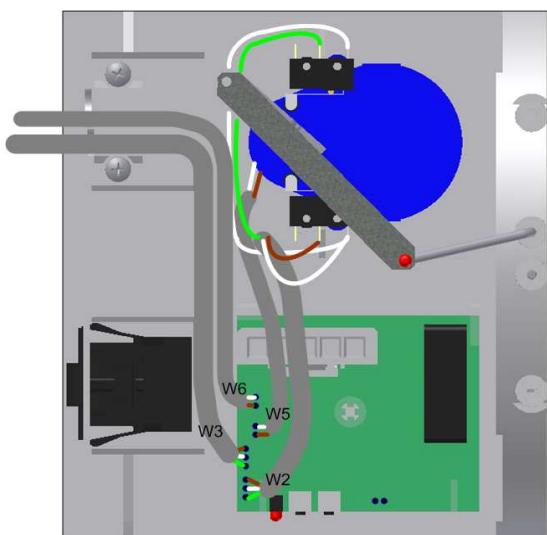


Figure 3 – Internal cabling for motor and position switches (2x40%)

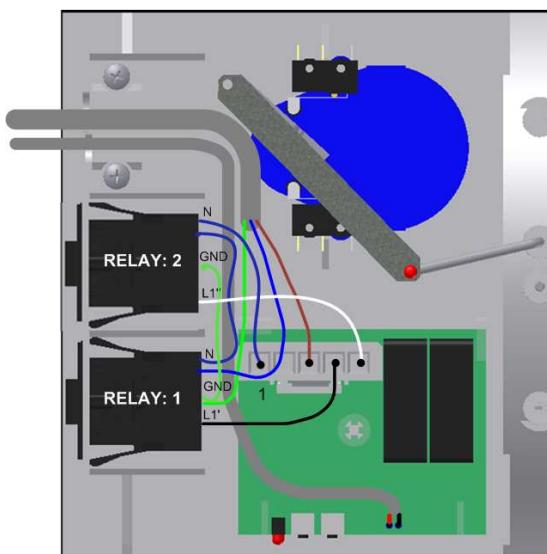


Figure 4 - Internal cabling of 230V mains and KNX for 2. Relay version

See Figure 5 for a schematic diagram of the cabling of 2 valve motors and 2 relays.

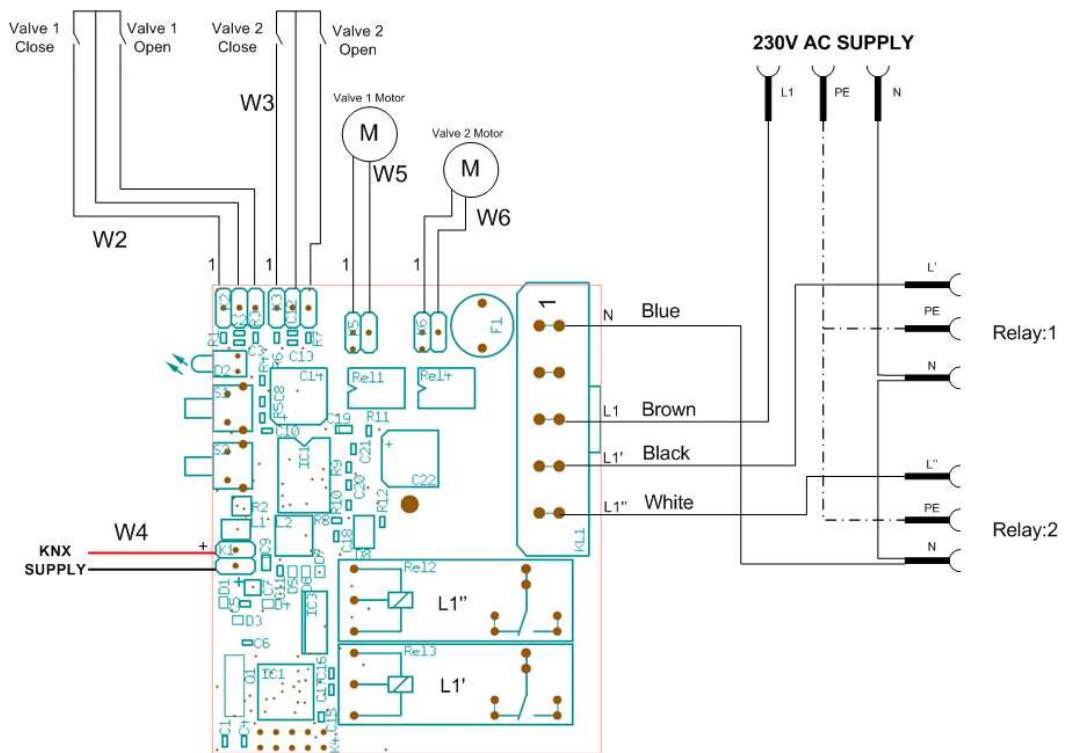


Figure 5 - Connections for the controller PCB

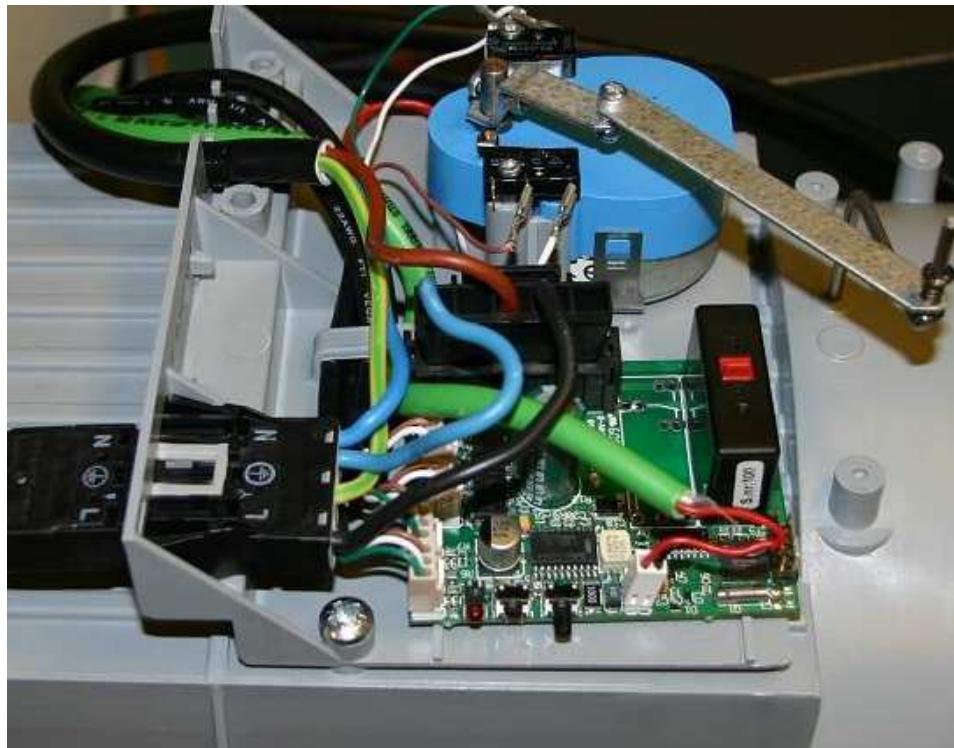


Figure 6 – Picture of controller card with cabling for a 1.relay version

6 List of objects

Tabell 1 – General objects

ID	Name	Description	Data type
OBJ 000	General: Self test status	<i>This object will report self test result and alive status with a "0" if everything is ok. If it sends "1" the self test has failed and the red LED will flash 5 times per second. The status will be re-set if a new command is executed successfully.</i>	1 bit 1.001 Flag: C R - T
OBJ 001	General: Fire operation	<i>Fire operation has the highest priority and will either open or close the valve blades based on the parameter "Fire operation".</i>	1 bit, 1.001 Flag: C - W -

Tabell 2 – Objects for valve blade 1

ID	Name	Description	Data type
OBJ 002	Valve 1: Switch	<i>The switch object for the valve blade. The parameter "Valve Control" must be set to "Switch" 0=valve closed, 1=valve open</i>	1 bit 1.001 Flag: C - W -
OBJ 002	Valve 1: Value	<i>The object for continuous control (0-100%) of the valve. The parameter "Valve Control" must be set to "Continuous" and appropriate limits specified for the parameters "Open valve on value higher than (%)" and "Close valve on value or lower than (%)"</i>	1 byte 5.001 Flag: C - W -
OBJ 003	Valve 1: Force open	<i>The valve blade will be forced open by setting this object high. The priority for operating the valve is either 2nd or 3rd depending on parameter "Forced Priority".</i>	1 bit 1.001 Flag: C - W -
OBJ 004	Valve 1: Force close	<i>The valve blade will be forced close by setting this object high. The priority for operating the valve is either 2nd or 3rd depending on parameter "Forced Priority".</i>	1 bit 1.001 Flag: C - W -
OBJ 005	Valve 1: Status	<i>The object will hold the current status (open or closed) for the valve blade (0=valve closed, 1=valve open)</i>	1 bit 1.001 Flag: C R - T
OBJ 006	Valve 1: Cycle counter	<i>Counts the number of operations for the valve blade (open and close). This value is stored permanent in EEPROM, and can only be re-set with a new value from the bus. ETS download will not overwrite this counter.</i>	4 byte 12.001 Flag: C R W -

Tabell 3 – Objects for valve blade 2

ID	Name	Description	Data type
OBJ 007	Valve 2: Switch	<i>The switch object for the valve blade. The parameter "Valve Control" must be set to "Switch" 0=valve closed, 1=valve open</i>	1 bit 1.001 Flag: C - W -
OBJ 007	Valve 2: Value	<i>The object for continuous control (0-100%) of the valve. The parameter "Valve Control" must be set to "Continuous" and appropriate limits specified for the parameters "Open valve on value higher than (%)" and "Close valve on value or lower than (%)"</i>	1 byte 5.001 Flag: C - W -
OBJ 008	Valve 2: Force open	<i>The valve blade will be forced open by setting this object high. The priority for operating the valve is either 2nd or 3rd depending on parameter "Forced Priority".</i>	1 bit 1.001 Flag: C - W -
OBJ 009	Valve 2: Force close	<i>The valve blade will be forced close by setting this object high. The priority for operating the valve is either 2nd or 3rd depending on parameter "Forced Priority".</i>	1 bit 1.001 Flag: C - W -
OBJ 010	Valve 2: Status	<i>The object will hold the current status (open or closed) for the valve blade (0=valve closed, 1=valve open)</i>	1 bit 1.001 Flag: C R - T
OBJ 011	Valve 2: Cycle counter	<i>Counts the number of operations for the valve blade (open and close). This value is stored permanent in eprom, and can only be re-set with a new value from the bus. ETS download will not overwrite this counter.</i>	4 byte 12.001 Flag: C R W -

Tabell 4 – Objects for relay 1 (Art.nr 54002 and 54003)

ID	Name	Description	Data type
OBJ 012	Relay 1: Switch	<i>The switch object to open or close the relay. The object works for switch actuator, delay function and staircase function (1=closed, 0=open).</i>	1 bit 1.001 Flag: C - W -
OBJ 012	Relay 1: Switch heating/cooling	<i>The object works as an ON/OFF control of the heating/cooling system. The object is enabled by choosing "Switch 1bit" for the "Type of telegram for control" parameter.</i>	1 bit 1.001 Flag: C - W -
OBJ 012	Relay 1: Continuous heating/cooling	<i>The object works as continuous (0-100%) control of the heating/cooling system. The object is enabled by choosing "Continuous 1byte" for the "Type of telegram for control" parameter.</i>	1 byte 5.001 Flag: C - W -
OBJ 013	Relay 1: Force operation	<i>The relay will be forced either ON or OFF (set by parameter) if this object is set high. The force operation has the highest priority</i>	1 bit 1.001 Flag: C - W -
OBJ 014	Relay 1: Disable delay function	<i>Switch off the delay timer function. The relay will switch momentarily if this object is set high.</i>	1 bit 1.001 Flag: C - W -
OBJ 014	Relay 1: Disable staircase function	<i>Switch off the staircase timer function. The relay will switch momentarily if this object is set high.</i>	1 bit 1.001 Flag: C - W -
OBJ 015	Relay 1: Change Duration	<i>Change the timer value in seconds for the Staircase function. The value is stored until next ETS download. NOTE: the time value is stored permanently in EEPROM, frequent delay changes could destroy the EEPROM.</i>	2 byte 8.001 Flag: C R W -

Tabell 4 – Continue

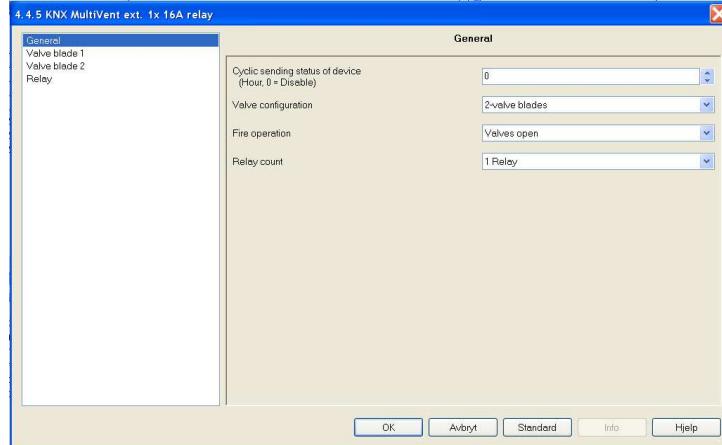
OBJ 016	Relay 1: Logic AND	<i>The object works as a AND gate for the relay output regardless of which function is enabled. Forced operation will override the AND gate. The AND gate is enabled by the parameter "Logic". This object has the initial value of "1" after power-on.</i>	1 bit 1.001 Flag: C - W -
OBJ 016	Relay 1: Logic OR	<i>The object works as an OR gate for the relay output regardless of which function is enabled. Forced operation will override the OR gate. The OR gate is enabled by the parameter "Logic". This object has the initial value of "0" after power-on.</i>	1 bit 1.001 Flag: C - W -
OBJ 017	Relay 1: Status switch	<i>Holds the status information about the relay output (1=relay closed, 0=relay open)</i>	1 bit 1.001 Flag: C R - T

Tabell 5 – Objects for relay 2 (Art.nr 54003)

ID	Navn	Beskrivelse	Data type
OBJ 018	Relay 2: Switch	<i>The switch object to open or close the relay. The object works for switch actuator, delay function and staircase function (1=closed, 0=open).</i>	1 bit 1.001 Flag: C - W -
OBJ 018	Relay 2: Switch heating/cooling	<i>The object works as an ON/OFF control of the heating/cooling system. The object is enabled by choosing "Switch 1bit" for the "Type of telegram for control" parameter.</i>	1 bit 1.001 Flag: C - W -
OBJ 018	Relay 2: Continuous heating/cooling	<i>The object works as continuous (0-100%) control of the heating/cooling system. The object is enabled by choosing "Continuous 1byte" for the "Type of telegram for control" parameter.</i>	1 byte 5.001 Flag: C - W -
OBJ 019	Relay 2: Force operation	<i>The relay will be forced either ON or OFF (set by parameter) if this object is set high. The force operation has the highest priority</i>	1 bit 1.001 Flag: C - W -
OBJ 020	Relay 2: Disable delay function	<i>Switch off the delay timer function. The relay will switch momentarily if this object is set high.</i>	1 bit 1.001 Flag: C - W -
OBJ 020	Relay 2: Disable staircase function	<i>Switch off the staircase timer function. The relay will switch momentarily if this object is set high.</i>	1 bit 1.001 Flag: C - W -
OBJ 021	Relay 2: Change Duration	<i>Change the timer value in seconds for the Staircase function. The value is stored until next ETS download. NOTE: the time value is stored permanently in EEPROM, frequent delay changes could destroy the EEPROM.</i>	2 byte 8.001 Flag: C R W -
OBJ 022	Relay 2: Logic AND	<i>The object works as a AND gate for the relay output regardless of which function is enabled. Forced operation will override the AND gate. The AND gate is enabled by the parameter "Logic". This object has the initial value of "1" after power-on.</i>	1 bit 1.001 C - W -
OBJ 022	Relay 2: Logic OR	<i>The object works as an OR gate for the relay output regardless of which function is enabled. Forced operation will override the OR gate. The OR gate is enabled by the parameter "Logic". This object has the initial value of "0" after power-on.</i>	1 bit 1.001 C - W -
OBJ 023	Relay 2: Status switch	<i>Holds the status information about the relay output (1=relay closed, 0=relay open)</i>	1 bit 1.001 Flag: C R - T

7 Parameters

General



"Cyclic sending status of device":

Choose the number of hours between cyclic sending of status [0..24].

"Valve configuration":

Choose to control one or two valve blades.

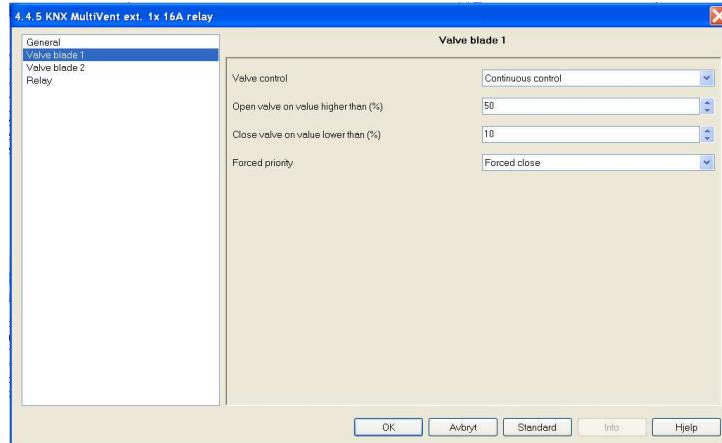
"Fire operation":

Choose either to open or close the valve blades (works for both valve blades)

"Relay count":

Choose 0, 1 og 2 relè. The choices will be limited depending on the hardware.

Valve blade 1 & 2



"Valve control":

Choose either "Switch" to get a 1. bit object or "Continuous control" to get a 1.byte control object.

"Open valve on value higher than (%)":

Value where the valve blade will open. Only visible for "Continuous control".

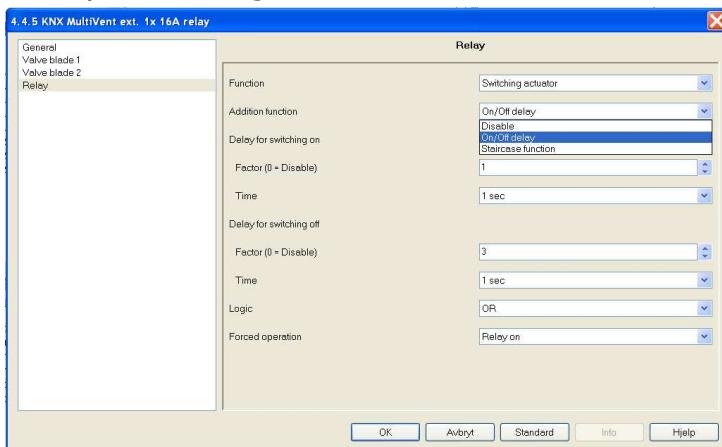
"Close valve on value lower than (%)":

Value where the valve blade will close. Only visible for "Continuous control".

"Forced priority":

Choose priority order for the force open and force close objects.

Relay - Switching actuator

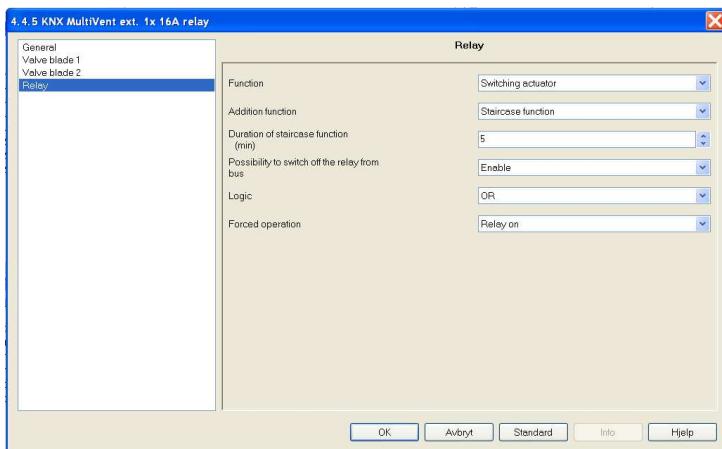


"Function":
Choose "Switching actuator" or "Heating/Cooling actuator" function for the relay.

"Additional function":
Choose "Disable", "On/off delay" or "Staircase function" for the switching actuator.

"Logic":
Activate object for logical function "AND" or "OR".

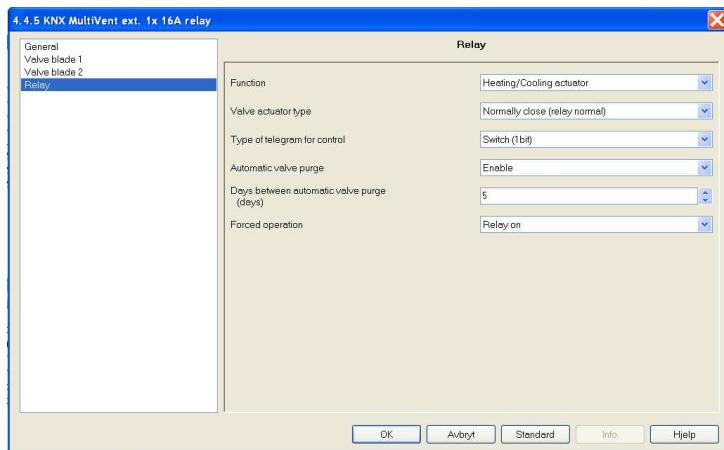
"Forced operation":
Choose if the relay should turn ON or OFF when the "Force operation" object is set.



"Staircase function"
Specify the number of minutes the "Staircase function" is on [0..255]. The staircase function is disabled by choosing 0.

"Possibility to switch off the relay from the bus":
Specify if the relay can be turned OFF when the staircase function is active.

Relay - Heating/Cooling actuator

**"Valve actuator type":**

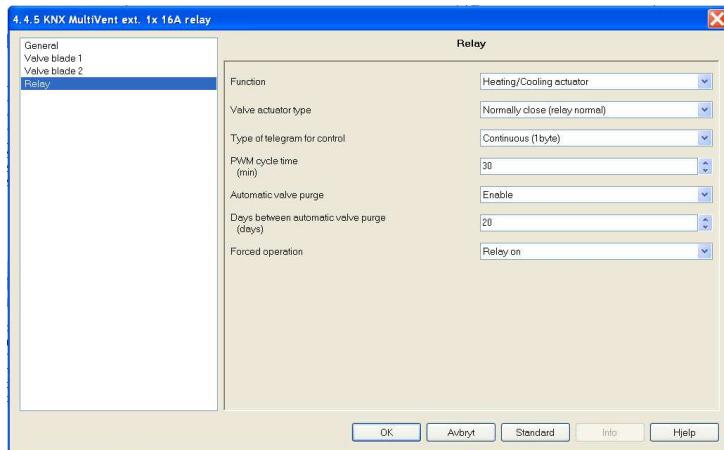
Specify if the valve is normally closed (no heat when the relay is off), or normally open (heat when the relay is off).

"Type of telegram for control":

Choose ON/OFF control (Switch 1. bit object) or PWM control (Contionous 1. byte object) of the heating or cooling system.

"Automatic vale purge":

Specify the number of days between valve purge. The valve purge will last for 5 minutes.

**"Continuous (1 byte)":**

Heating/cooling actuator

PWM cycle time (min):

Specify the time period for the PWM control in minutes.

8 Technical data

Power	- Operating voltage - Current consumption KNX - 230V AC	21-30 V DC, made available by the bus Normally 7mA, Peak 18mA 12VA when both valves are operated
Output relay	- Number potential free contacts - Un rated voltage - In rated current (one relay/two relays)) - Power loss at max. load - Mechanical operations	2 (in group for YIT Valve) 230 VAC (50 Hz) 10A/16A 4W 100.000
Output relay switching power	- Fluorescent light (70µF) - Incandescent light bulbs - Transformer for halogen bulbs - Heat cables, heaters etc. - Maximum inrush current	650W 1200W 500VA 1250W 260A / 250 µS
Output motor valves	- Number - U_N rated voltage - I_N rated current each output	2 230 VAC (50 Hz) 0,3A
Inputs	- Valve blade position switches - Polling voltage U_N - Sensing current I_N - Permitted cable lengths	4 3.7V 0.4mA 1m
Connections	- KNX - 230V	via Molex terminal, without screws via Molex terminal, without screws
EIB / KNX voltage	- SELV 24 V DC (safety extra low voltage)	
Temperature range	- Operation - Storage - Transport	- 5 °C ... + 45 °C - 25 °C ... + 55 °C - 25 °C ... + 70 °C
Design Approvals CE mark	- Dimensions (H x W x D) - EIB / KNX EN 50 090-2-2 - In accordance with the EMC guideline and low voltage guideline.	31mm x 76mm x 62mm Certification

Data subject to change without notice

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